

Claim Rejections under 35 USC §102

6. The Examiner rejects claims 1-3, 11-13, 15-17, 19, 24, 25, 28-30, and 36-38 as being anticipated by DE4402943.

The Applicant notes that DE4402943 relates to a polymeric working material with a polyethylene component wetted by a silane group, and to a process for the production of such working material by dynamic silane wetting (page 3, lines 16-17). The Applicant respectfully submits that amended claim 1 now clearly emphasizes that the steps of grafting and cross-linking of the organic silane in the process of the present invention does not require the addition of water, or wetting or moisture, or the addition of a cross-linking catalyst-containing solution.

Therefore, the Applicant believes that amended claim 1 is clearly inventive over DE4402943 and that the Examiner's lack-of-novelty objection is traversed.

Consequently, all the claims dependent from claim 1 are believed to be novel.

Claim Rejections under 35 USC §103

7. The Examiner cites DE4402943, US 4,558,094, US 4,873,042, US 5,623,030, US 5,840,800, alone or in combination, as depriving claims 4-10, 14, 18, 20-23, 26-27, 31-35 and 39-41 of inventiveness.

The Applicant submits that the present invention provides a process for making thermoplastic vulcanizates, wherein full vulcanization of the elastomer is carried out (page 4, lines 10-12). The process of the present invention is characterized by the use of a cross-linking agent comprising an acid, and the absence of water addition. These conditions, when cumulated, enable a very fast and effective cross-linking of the silane moieties leading to almost full cross-linking of the disperse phase (above 95%) within a short time (page 4, lines 29-30).

DE4402943 (Fritz et al.) uses dynamic silane wetting (page 3, lines 16-17) and teaches that catalytic reagents, such as organic acids or amines, may be added to shift the pH value of the wetting solution into the acid or alkali region. Therefore, in contrast to the process disclosed in the present invention, the process of DE4402943 requires the addition of water by wetting to obtain the desired results. An average person skilled in the art would also understand from Fritz et al. that organic acids or amines are useful catalysts to shift pH values, which is only relevant in water-based solutions.

US 5,623,030 (Tsumura et al.) discloses compositions with and without water, while teaching the advantages of water addition for accelerating the hydrolysis of the alkoxysilyl groups (col. 13, lines 29-36). Tsumura et al. use silanol cross-linking catalysts in the amount of 0.01-20 parts by weight to 100 parts of siloxane component (col. 12 lines 66-67 and col. 13, lines 1-2). In contrast, the present invention uses a weight ratio of cross-linking agent to silane from 1:3 to 1:1 (page 7, lines 19-20 and page 8, lines 1-2). This ratio, in combination with other elements disclosed in the present invention, provides very fast and full cross-linking of the thermoplastic polymer. Tsumura et al. also teach that cross-linking process lasts tens of hours (col. 14, lines 24 and 40-42). In contrast, the dynamic vulcanization process of the present invention, in particular in continuous mode, enables the cross-linking step to be completed within the residence time in the extruder, i.e. between 1 to 5 minutes (page 13, line 8).

Therefore, the Applicant respectfully submits that neither DE4402943, nor US 5,623,030 mentions obtaining full vulcanization of the polymers within a short time.

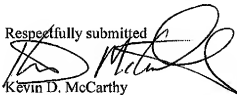
Therefore, an average person skilled in the art would not have the technical motivations to take the above-cited publications or combine them to achieve the results of the present invention. Furthermore, based on the above publications, an average person skilled in the art would not have been led to choose particularly a water-free process or to select an organic acid from the long list of catalysts for silanol condensation.

Therefore, the Applicant respectfully submits that amended claim 1, as well as all the claims dependent from claim 1, are inventive.

Conclusion

8. As it is believed that all of the rejections set forth in the Office Action have been fully addressed, favorable reconsideration and allowance are earnestly solicited.

Respectfully submitted



Kevin D. McCarthy

Reg. No. 35,278

Roach, Brown, McCarthy & Gruber, P.C.
1920 Liberty Building - 424 Main Street
Buffalo, New York 14202